

REMARKS

Claims 1-19, 22-42, 45, and 46 remain in the application. Independent Claims 1 and 24 are amended to overcome rejections under 35 USC 112.

Claims 1-19, 22-42, and 45-46 are rejected under 35 USC 112, first paragraph, as failing to comply with the written description requirement.

The Examiner contends that the written description as to the multivalent salts interacting with the polymer "at an appropriate pH" is not supported in the specification.

Applicants have deleted the phrase "at an appropriate pH" in independent Claims 1 and 24. Further, Applicants have amended Claims 1 and 24 to recite the interactions with the styrene-maleic anhydride copolymer with the multi-valent salts and the organic acids, based on the disclosure in paragraphs 0028 and 0030, respectively.

The specification clearly discloses interaction of the styrene/maleic anhydride polymers in the black ink "interact with incompatible multi-valent (inorganic or organic) salts in the second, or color, ink" (paragraph 0028). Likewise, "[a]n ink-jet ink composition employing an organic acid component and having an appropriate pH will render insoluble the pigment dispersion in the black inks by transforming the SMA polymer into water-insoluble protonated form" (paragraph 0030). Thus, in both instances, the interaction with the SMA polymer results in an insoluble product. It is this insoluble product that inhibits black-to-color bleed.

Both claims, as amended, recite

"wherein said at least one color ink includes a component selected from the group consisting of multivalent salts and organic acids wherein said styrene-maleic anhydride copolymer interacts with said multivalent salts which are incompatible therewith or wherein said styrene-maleic anhydride copolymer interacts with said organic acids by rendering said pigment dispersed with said polymer in said black ink insoluble by transforming said polymer into a water-insoluble protonated form, ..."

Applicants submit that, based on the foregoing, the claims are supported by the written description.

Reconsideration of the rejection of Claims 1-19, 22-42, and 45-46, as amended, under 35 USC 112, first paragraph, is respectfully requested.

Claims 1-19, 22-42, and 45-46 are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

The Examiner objects to the term "appropriate pH".

The objected-to term is deleted, thereby obviating the rejection.

Claims 1-19, 22-42, and 45-46 are rejected under 35 USC 103(a) as being unpatentable over Parazak (U.S. Patent 6,281,267) in view of Zhu (U.S. Patent 5,889,083).

Both references have been extensively discussed in prior Office Actions and in Applicants' responses thereto.

Essentially, there is but one issue to consider, namely, whether it would have been obvious to one skilled in the art at the time of the invention to have combined the references.

The Examiner argues that it would have been obvious to combine the references. Early on, the Examiner admitted that the difference between Parazak and the present invention is the requirement in the claims of hydrolyzed styrene-maleic anhydride copolymer (Office Action dated May 13, 2005). The Examiner in that Action further stated that Zhu, which is drawn to ink jet ink, discloses the use of hydrolyzed styrene-maleic anhydride (SMAH) copolymer, and argued that the motivation for using such polymer is as a binder in order to fix the colorant of the ink to the substrate and to provide abrasion protection, citing Col. 4, lines 47-54 and 62-67, Col. 5, line 63, and Col. 6, lines 5-9 and 31-39.

Zhu specifically states:

"The ink composition of the present invention comprises a binder resin. The binder resin is a film former which upon drying of the ink leaves a film on the colorant. The film thus formed is responsible for fixing the colorant to the substrate. The film, in combination with the wax and other ingredients of the ink composition, also provides the jet printed messages a measure of protection against abrasion." (Col. 4, lines 48-54)

Applicants note that the system of Zhu is directed to fixing the colorant of a single ink composition on a substrate, by forming a film on the colorant.

Such a disclosure, however, hardly suggests Applicants' solution to controlling bleed. Bleed is defined in the specification, paragraph 0003, as follows:

"When inks of two different colors are printed next to each other, it is desired that the border between the two colors be clean and free from the invasion of one color into the other. When one color does invade into the other, the border between the two colors becomes ragged, and this is bleed."

Applicants' invention is directed to the use of color inks that are dye-based and black inks that are pigment-based. The dyes in the color inks are soluble in water, while the pigments in the black inks are insoluble in water. Nothing in Zhu discloses that SMAH would act to prevent bleed between color inks and black inks. While SMAH might fix the black inks to the substrate, as taught by Zhu, there is not the slightest disclosure or suggestion as to what effect, if any, SMAH might have on dyes in color inks. Indeed, Zhu is unconcerned with dye-based color inks, and instead employs pigment-based color inks, where bleed between color inks and black inks is of no concern.

Parazak uses a pigmented black and color ink as do Applicants, but the similarity ends there. The black ink in Parazak's system contains an acrylate polymer, while the black ink in Applicants' system contains SMAH. Given Zhu, the question is why would one be directed to trying SMAH in a Parazak-type of system when Zhu is using the material for fixing a pigment to a substrate and for abrasion resistance and no mention is ever made of black-to-color bleed. Zhu is not even employing an ink set that contains a black pigment-based ink and a color dye-based ink. In fact, Zhu's invention is just not the use of SMAH in the ink but the combination of SMAH **and** a wax in the ink to address abrasion. Nowhere does Zhu mention or even remotely suggest that the addition of SMAH to an ink could have additional benefits such as bleed control. The structures of SMAH of Zhu and the acrylates cited in Parazak are very different, so there is no logical reason to substitute one for the other, other than that both are compatible with aqueous systems and one might begin trying water soluble polymers in an effort to address the problem. However, the test is not "obvious to try". The same is true of Parazak.

Finally, while Zhu discloses black and color inks, there is no disclosure of ink-jet ink **sets**, as claimed by Applicants. That is to say, there is not the slightest disclosure or suggestion of the effects of printing a pigment-based black ink adjacent a dye-based color ink.

The Examiner cites as the motivation to use SMAH the fact that the polymer is used as a binder by Zhu to fix the colorant of the ink to the substrate and to provide abrasion protection. However, fixing the colorant to the substrate in no way is suggestive of controlling black-to-color bleed. One skilled in the art, seeking to improve control of black-to-color bleed in a Parazak-type ink system (black pigment-based inks and color dye-based inks), would hardly consult Zhu (pigment-based inks only) for a solution to this problem.

It appears that the Examiner has found a reference in the inkjet art that employs SMAH and is trying to justify her position. However, first, the Examiner is impermissibly extracting bits and pieces from a reference (Zhu) to cobble together a facsimile of Applicants' claims, where Zhu is totally silent on black-to-color bleed. Contrary to the Examiner's assertion, there is, in fact, no motivation on the part of the artisan to employ the teachings of Zhu to improve control of black-to-color bleed.

It further appears that the Examiner is confusing fixing a pigment-based colorant to a substrate with controlling black-to-color bleed between black pigment-based ink and color dye-based ink. These are simply two quite disparate problems, and a solution to one problem is in no way suggestive of a solution to the other problem.

The Examiner is respectfully reminded of the requirements, set forth in MPEP 706.02(k), to establish a *prima facie* case of obviousness:

(1) There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

(2) There must be a reasonable expectation of success.

(3) The prior art references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Applicants' disclosure.

Applicants submit that the Examiner has failed to establish the requisite *prima facie* case. Nothing in the references suggests modifying Parazak and nothing in the references suggests combining the teachings of Parazak and Zhu. Since no suggestion is made to combine the teachings, there can be no reasonable expectation of success. Finally, the references fail to teach all the claim limitations. As noted above, the teaching by Zhu to fix a pigment-based colorant of the ink to the substrate and to provide abrasion protection utterly fails to suggest controlling black-to-color bleed between a pigment based-ink and a dye-based ink.

Reconsideration of the rejection of Claims 1-19, 22-42, and 45-46, as amended, under 35 USC 103(a) as being unpatentable over Prazak in view of Zhu is respectfully requested.

The foregoing amendments and arguments are submitted to place the application in condition for allowance or in better condition for appeal. The Examiner is accordingly respectfully requested to enter this Amendment. If the Examiner has any questions, she is invited to contact the undersigned at the below-listed telephone number. HOWEVER, ALL WRITTEN COMMUNICATIONS SHOULD CONTINUE TO BE DIRECTED TO: IP ADMINISTRATION, LEGAL DEPARTMENT, M/S 35, HEWLETT-PACKARD COMPANY, P.O. BOX 272400, FORT COLLINS, CO 80527-2400.

Respectfully submitted,

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